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(54) **Remote controller system for electric toy car racing track**

Fernsteuerungsanordnung für elektrische bahngebundene Spielzeugautos

Système de commande à distance pour voitures-jouet électriques sur circuit

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(56) References cited:
EP-A- 0 381 594
DE-A- 4 323 795
US-A- 4 207 502
EP-A- 0 728 505
US-A- 3 926 434

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Description

[0001] The present invention relates to a remote controller system for an electric toy car racing track. Such a system is disclosed in document EP-A-0 381 594.

[0002] Document EP-A-0381594 discloses a remote controller system for use with an electric toy car racing track formed by a series of track sections connected together to provide lanes having co-extending pairs of power supply rails for supplying power to electric toy cars running along respective lanes, wherein the system comprises a transmitter for use by a respective player relative to each lane and a receiver for electrical connection to the power supply rails, said transmitter including a signal generator for generating a control signal for transmission in a wireless manner, said receiver including a signal processor for processing the control signal received from the transmitter to determine the characteristic of the voltage supplied to the respective pair of power supply rails for controlling the movement of the associated toy car.

[0003] Electric toy car racing tracks are generally known, which are typically formed by a series of interconnected track sections to provide at least two side-by-side lanes, each having a pair of power supply rails, for respective electric toy cars to run along. The toy cars are to be controlled by players by means of respective hand-held controllers which are electrically connected by wires to the corresponding pairs of power supply rails via a power intake track section.

[0004] The invention seeks to provide a modified controller system for an electric toy car racing track, which is more convenient to use than the existing controller systems.

[0005] According to the invention, there is provided an add-on remote controller system adapted for optional use with a conventional electric toy car racing track formed by a series of track sections including a power intake track section connected together to provide lanes having co-extending pairs of power supply rails for supplying power to electric toy cars running along respective lanes, said power intake track section including terminals connected to the power supply rails of each lane for electrical connection to terminals of a power source controllable by means of a wired controller, which system comprises a transmitter for use by a respective player relative to each lane and a receiver for electrical connection to the power supply rails, said transmitter including a signal generator for generating a control signal for transmission in a wireless manner, said receiver including a signal processor for processing the control signal received from the transmitter to determine the characteristic of the voltage supplied to the respective pair of power supply rails for controlling the movement of the associated toy car, wherein the receiver is adapted for use between said power intake track section and said power source, and the receiver has output terminals for electrical connection to the terminals of said power intake track section and input terminals for electrical connection to the terminals of said power source.

[0006] Preferably, the control signal is transmitted from a respective transmitter and received by the receiver in the form of a radio frequency signal.

[0007] More preferably, the radio frequency signal is amplitude modulated.

[0008] It is preferred that the receiver incorporates a voltage regulator to determine the characteristic of the voltage supplied to the power supply rails.

[0009] In a first preferred embodiment, the voltage regulator is adapted to change the level of the voltage supplied to the power supply rails.

[0010] In a second preferred embodiment, the voltage regulator is adapted to change the duty cycle of the voltage supplied to the power supply rails.

[0011] In a third preferred embodiment, the voltage regulator is adapted to change the frequency of the voltage supplied to the power supply rails.

[0012] It is preferred that the receiver is adapted to gradually adjust the characteristic of the voltage supplied to the power supply rails over a predetermined range.

[0013] More preferably, each transmitter incorporates a variable resistor to determine the control signal for controlling the receiver to gradually adjust the characteristic of the voltage supplied to the power supply rails.

[0014] It is alternatively preferred that the receiver is adapted to select the characteristic of the voltage supplied to the power supply rails between predetermined values.

[0015] More preferably, each transmitter incorporates a selector switch to determine the control signal for controlling the receiver to select the characteristic of the voltage supplied to the power supply rails.

[0016] In a preferred arrangement, the receiver is adapted to be electrically connected between the power supply rails and a power supply source for a said racing track.

[0017] The invention also provides a conventional electric toy car racing track in combination with the aforesaid remote controller system.

[0018] The invention will now be more particularly described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a top plan view of an embodiment of a remote controller system formed by a transmitter and a receiver, in accordance with the invention, for use with an electric toy car racing track comprising an endless track and a power supply unit;

Figure 2 is an internal side view of the transmitter of Figure 1;

Figures 3A and 3B are functional block diagrams of respective operating circuitries of the transmitter and the receiver of Figure 1;

Figure 4 is a detailed circuit diagram of the transmitter operating circuitry of Figure 3A;

Figure 5 is a detailed circuit diagram of the receiver operating circuitry of Figure 3B;

Figures 6A to 6E are five graphs showing the relationships between the speed of a toy car and the characteristics of the voltage supplied to the toy car running on the racing track under the control of the remote controller system of Figure 1; and

Figures 7A and 7B are top plan views of the internal drive mechanism, in different operating conditions, of a toy car.

[0019] Referring initially to Figure 1 of the drawings, there is shown a remote controller system 10 embodying the invention, which system 10 is formed by two transmitters 20 for use by players to control respective electric toy cars (not shown) and a receiver 30 for use with an electric toy car racing track system comprising an endless racing track 40 and a power supply unit 50. The racing track 40 is formed by a loop of inter-connected track sections 41, including a power intake track section 42, to provide two co-extensive lanes 40A and 40B along which the respective toy cars are to run. Each lane 40A/40B has a central groove 43 for guiding a bottom peg of the respective toy car running therealong and two power supply rails 44 provided on opposite sides of the groove 43 for supplying power to the toy car. The power intake track section 42 has an outer side tab 45 on which two pairs of contact terminals 45T are provided in electrical connection with respective pairs of power supply rails 44.

[0020] The power supply unit 50 is provided by a battery box 51 containing, for example, eight battery cells to form a 6V DC power source (Vcc in Figure 5). The battery box 51 has a front side tab 52 on which two pairs of supply terminals 52T are provided in electrical connection with the battery cells. The pairs of supply terminals 52T are connected with the respective pairs of contact terminals 45T by electrical wires such that the power supply unit 50 is electrically connected to the power supply rails 44. The battery box 51 includes a rear side tab 53 having two pairs of contact terminals 53T. Each pair of contact terminals 53T represents a break in the power circuit of respective pair of power supply rails 44 and toy car and is provided for the connection of a conventional hand-held controller by means of electrical wires. The controller is in effect a variable resistor for controlling the voltage applied to the respective pair of power supply rails 44 and, in turn, the speed of the toy car.

[0021] The construction and operation of the racing track 40 and the power supply unit 50, as described above, are generally known in the art. As an alternative, the power supply unit 50 may be replaced by a voltage adaptor connected to the mains power supply.

[0022] The receiver 30 has a casing 31 which is provided with front and rear side tabs 32 and 33, each having a channel-shaped cross-section and two pairs of output/input terminals 32T/33T. The receiver 30 is used between the power intake track section 42 and the power supply unit 50, with the tabs 32 and 33 slidably engaging the respective tabs 45 and 52 on opposite sides, such that the output and input terminals 32T and 33T come into electrical connection with the respective contact and supply terminals 45T and 52T.

[0023] Reference is now made to Figures 2 to 5 of the drawings. Each transmitter 20 has a pistol handgrip-like body 21 including a spring-loaded trigger 22, an internal sliding selector switch 23 and an upwardly extending antenna 24. The transmitters 20 and the receiver 30 have respective internal electronic operating circuitries 25 and 35 which are wireless-linked together for the transmitters 20 to control the operation of the receiver 30.

[0024] Each transmitter circuitry 25, which is powered by a self-contained battery cell 28, is formed by a bistable oscillator 26 connected to the selector switch 23 and an AM (amplitude modulation) modulator 27 tuned to have a carrier frequency of 27MHz (for one transmitter 20) or 40MHz (for the other transmitter 20) and connected to the respective antenna 24. The receiver circuitry 35 has two parts for respective transmitters 20, each of which parts is formed by a combined RF (radio frequency) amplifier/demodulator 36 connected to a common antenna 34 (Figure 1), an amplifier 37, a signal processor 38, a pair of transistor switches 38A and an output driver 39.

[0025] In each transmitter circuitry 25, the oscillator 26 is designed to generate a square-wave control signal of either 1kHz or 2.6kHz which is selectable by means of the selector switch 23 connecting either resistors R3/R4 or resistors R2/R5 (Figure 4). The AM modulator 27 serves to provide an amplitude modulated control signal, at a carrier frequency of 27MHz or 40MHz, for emission by means of the respective antenna 24.

[0026] In each part of the receiver circuitry 35, the RF amplifier/demodulator 36 serves to receive the amplitude modulated control signal by means of the common antenna 34 and then to recover, through demodulation, the 1kHz or 2.6kHz control signal generated by the oscillator 26 of the respective transmitter 20. The demodulated control signal is amplified by the amplifier 37 and then fed to the signal processor 38.

[0027] The signal processor 38 is in the form of an IC (integrated circuit) chip which has an input pin 1 for receiving the control signal and two output pins 6 and 7. The chip 38 is programmed such that the output pin 6 provides a logic high (3V) when a control signal of 1kHz is received and that the other output pin 7 provides a logic high (3V) upon the receipt of a control signal of 2.6kHz. The transistor switches 38A are connected to the corresponding output pins 6 and 7 for modifying the corresponding logic high (3V) to relatively low or high control signal of 4.0-4.5V or 4.3-4.8V, respectively. The

modified control signals may vary according to the loading condition but will remain at a difference of 0.3V. The modified control signal is finally fed to the output driver 39, which acts as a voltage regulator, for providing a correspondingly low or high track voltage across the respective pair of power supply rails 44 for driving the associated toy car (motor M) at a low or high speed.

[0028] The power supply unit 50 is connected to the power supply rails 44 via the receiver 30 (by means of the respective terminals 52T, 45T, 32T and 33T) and in particular the output driver 39 acting as a voltage regulator. The receiver circuitry 35 is powered by the power supply unit 50.

[0029] As illustrated in Figure 6A of the drawings, the speed of the toy cars is determined by the (actual) level of the track voltage in direct proportion. In a different embodiment, the output driver 39 may be configured to provide a pulsating track voltage (in square-wave form) and alter the average (or means) level of the track voltage by changing its duty cycle, such as 50% on/50% off (Figure 6B) for low speed and 75% on/25% off (Figure 6C) for high speed running of the toy cars. In another different embodiment, as illustrated in Figures 6D and 6E, the frequency of the pulsating track voltage may be altered by the output driver 39 such that a lower frequency is for low speed running and a higher frequency is for high speed running.

[0030] In all the described embodiments, it is envisaged that the track voltage may be adjusted to vary over a certain continuous range, rather than having only two predetermined high/low levels, such that the speed of the toy cars may be controlled in a gradual manner. In this regard, among other things, the selector switch 23 of the transmitter circuitry 25 should be replaced by a suitable variable resistor.

[0031] For the control of the speed of the toy cars, instead of changing the actual or average/means level of the track voltage, the polarity of the track voltage may be reversed. Such a speed control requires the use of a special drive mechanism 60 for the toy cars, for example, as shown in Figures 7A and 7B. The level, duty cycle, frequency and polarity, etc, of the track voltage are characteristics to be altered, changed or adjusted for controlling the speed of the toy cars.

[0032] The drive mechanism 60 is formed by an electric motor 61 having a motor pinion 62, a pair of opposed crown wheels 63A and 63B for simultaneously driving by the pinion 62 to rotate in opposite directions, and two co-axial axles 65A and 65B for rotation by respective crown wheels 63A and 63B in said opposite directions about a common axis. A gear train 64 is employed between the crown wheel 63B and the axle 65B for reducing the speed of the axle 65B compared with the other axle 65A. The crown wheel 63A and the gear train 64 are rotatably engageable with the respective axles 65A and 65B by means of respective one-way ratchets/clutches 66A and 66B, as shown. The clutches 66A and 66B are arranged to operate (hold/slip) in opposite senses such that when one clutch 66A/66B holds/slips the other clutch 66B/66A slips/holds.

[0033] In an operating condition where the motor 61 is powered at the polarity as shown in Figure 7A, the crown wheel 63A rotates the axle 65A, through holding of the clutch 66A, in a car-forward-moving direction. Although the other crown wheel 63B is rotated (by the same pinion 62) in the opposite direction, the clutch 66B slips to allow the associated axle 65B to follow and roll freely with the driven axle 65A, via engagement of respective car wheels on the track surface. Hence, the toy car moves forwards.

[0034] In a different operating condition where the motor 61 is powered at the opposite polarity as shown in Figure 7B, the motor 61 and the crown wheels 63A and 63B rotate in the reverse direction, causing the clutch 66A to slip and the clutch 66B to hold. Through holding of the clutch 66B, the crown wheel 63B rotates the axle 65B in the reverse, now car-forward-moving direction and at a reduced speed caused by the gear train 64. Slipping of the other clutch 66A allows the associated axle 65A to roll freely with the driven axle 65B, via the car wheels and track surface. Hence, the toy car remains moving forwards, albeit at slower speed.

[0035] The reversing of the polarity of the track voltage may be effected by suitable transistor switches in the receiver circuitry 35 configured to re-arrange the positive (Vcc) and the earth connections of the power supply unit 50.

[0036] It is to be appreciated that the use of the transmitter 20 and receiver 30 of the described controller system 10 with the racing track 40 is optional, in that the racing track 40 itself may instead be controlled by means of the conventional wired controllers. The use of the controller system 10 to enable wireless remote control, without the need to modify the construction of the racing track 40 and the toy cars as generally known in the art, is simple and greatly enhances the fun of playing.

[0037] In a different embodiment, the wireless link between the transmitters 20 and the receiver 30 may be established by means of FM (frequency modulated) or infrared signal or any other suitable wireless control signal. Also, the racing track 40 may be powered by domestic mains power supply instead of battery cells.

[0038] The invention has been given by way of example only, and various other modifications of and/or alterations to the described embodiments may be made by persons skilled in the art without departing from the scope of the invention as specified in the appended claims.

Claims

1. An add-on remote controller system (10) adapted for optional use with a conventional electric toy car racing track (40) formed by a series of track sections

(41 & 42) including a power intake track section (42) connected together to provide lanes (40A & 40B) having co-extending pairs of power supply rails (44) for supplying power to electric toy cars running along respective lanes (40A & 40B), said power intake track section (42) including terminals (45T) connected to the power supply rails (44) of each lane (40A/40B) for electrical connection to terminals (52T) of a power source (50) controllable by means of a wired controller, which system (10) comprises a transmitter (20) for use by a respective player relative to each lane (40A/40B) and a receiver (30) for electrical connection to the power supply rails (44), said transmitter (20) including a signal generator (26) for generating a control signal for transmission in a wireless manner, said receiver (30) including a signal processor (38) for processing the control signal received from the transmitter (20) to determine the characteristic of the voltage supplied to the respective pair of power supply rails (44) for controlling the movement of the associated toy car, wherein the receiver (30) is adapted for use between said power intake track section (42) and said power source (50), and the receiver (30) has output terminals (32T) for electrical connection to the terminals (45T) of said power intake track section (42) and input terminals (33T) for electrical connection to the terminals (52T) of said power source (50).

2. The remote controller system (10) as claimed in claim 1, **characterised in that** the control signal is transmitted from a respective transmitter (20) and received by the receiver (20) in the form of a radio frequency signal.

3. The remote controller system (10) as claimed in claim 2, **characterised in that** the radio frequency signal is amplitude modulated.

4. The remote controller system (10) as claimed in claim 1, **characterised in that** the receiver (30) incorporates a voltage regulator (39) to determine the characteristic of the voltage supplied to the power supply rails (44).

5. The remote controller system (10) as claimed in claim 4, **characterised in that** the voltage regulator (39) is adapted to change the level of the voltage supplied to the power supply rails (44).

6. The remote controller system (10) as claimed in claim 4, **characterised in that** the voltage regulator (39) is adapted to change the duty cycle of the voltage supplied to the power supply rails (44).

7. The remote controller system (10) as claimed in claim 4, **characterised in that** the voltage regulator (39) is adapted to change the frequency of the voltage supplied to the power supply rails (44).

8. The remote controller system (10) as claimed in claim 1, **characterised in that** the receiver (30) is adapted to gradually adjust the characteristic of the voltage supplied to the power supply rails (44) over a predetermined range.

9. The remote controller system (10) as claimed in claim 8, **characterised in that** each transmitter (20) incorporates a variable resistor (23) to determine the control signal for controlling the receiver (30) to gradually adjust the characteristic of the voltage supplied to the power supply rails (44).

10. The remote controller system (10) as claimed in claim 1, **characterised in that** the receiver (30) is adapted to select the characteristic of the voltage supplied to the power supply rails (44) between predetermined values.

11. The remote controller system (10) as claimed in claim 10, **characterised in that** each transmitter (20) incorporates a selector switch (23) to determine the control signal for controlling the receiver (30) to select the characteristic of the voltage supplied to the power supply rails (44).

12. The remote controller system (10) as claimed in claim 1, **characterised in that** the receiver (30) is adapted to be electrically connected between the power supply rails (44) and a power supply source (50) for a said racing track (40).

13. A conventional electric toy car racing track (40) in combination with the remote controller system (10) as claimed in claim 1.

Patentansprüche

1. Anbaufernsteuerungssystem (10), das für eine wahlfreie Verwendung bei einer konventionellen elektrischen Spielzeugautorennbahn (40) zugeschnitten ist, die durch eine Reihe von Bahnabschnitten (41 & 42) gebildet wird, die einen Stromaufnahmebahnabschnitt (42) umfassen, die miteinander verbunden sind, um Fahrbahnen (40A & 40B) zu liefern, die sich gleich weit erstreckende Paare von Stromversorgungsschienen (44) für das Zuführen von Strom zu den elektrischen Spielzeugautos aufweisen, die auf den entsprechenden Fahrbahnen (40A & 40B) fahren, wobei der Stromaufnahmebahnabschnitt (42) Anschlußklemmen (45T) umfaßt, die mit den Stromversorgungsschienen (44) einer jeden Fahrbahn (40A/40B) für eine elektrische Verbindung mit Anschlußklemmen (52T) einer Stromquelle (50) verbunden sind, die mittels ei-

nes verdrahteten Reglers steuerbar ist, wobei das System (10) einen Sender (20) für eine Benutzung durch einen entsprechenden Spieler relativ für jede Fahrbahn (40A/40B) und einen Empfänger (30) für eine elektrische Verbindung mit den Stromversorgungsschienen (44) aufweist, wobei der Sender (20) einen Signalgenerator (26) für das Erzeugen eines Steuersignals für eine Übertragung in einer drahtlosen Weise umfaßt, wobei der Empfänger (30) einen Signalprozessor (38) für das Verarbeiten des vom Sender (20) empfangenen Steuersignals umfaßt, um die Kennlinie der Spannung zu ermitteln, die dem entsprechenden Paar der Stromversorgungsschienen (44) für das Steuern der Bewegung des damit verbundenen Spielzeugautos zu ermitteln, worin der Empfänger (30) für eine Verwendung zwischen dem Stromaufnahmebahnabschnitt (42) und der Stromquelle (50) angepaßt ist, und worin der Empfänger (30) Ausgangsklemmen (32T) für eine elektrische Verbindung mit den Anschlußklemmen (45T) des Stromaufnahmebahnabschnittes (42) und Eingangsklemmen (33T) für eine elektrische Verbindung mit den Anschlußklemmen (52T) der Stromquelle (50) aufweist.

2. Fernsteuerungssystem (10) nach Anspruch 1, **dadurch gekennzeichnet, daß** das Steuersignal von einem entsprechenden Sender (20) übertragen und vom Empfänger (30) in der Form eines Hochfrequenzsignals empfangen wird.

3. Fernsteuerungssystem (10) nach Anspruch 2, **dadurch gekennzeichnet, daß** das Hochfrequenzsignal amplitudenmoduliert ist.

4. Fernsteuerungssystem (10) nach Anspruch 1, **dadurch gekennzeichnet, daß** der Empfänger (30) einen Spannungsregler (39) enthält, um die Kennlinie der Spannung zu ermitteln, die den Stromversorgungsschienen (44) zugeführt wird.

5. Fernsteuerungssystem (10) nach Anspruch 4, **dadurch gekennzeichnet, daß** der Spannungsregler (39) so ausgeführt ist, daß er das Niveau der Spannung verändert, die den Stromversorgungsschienen (44) zugeführt wird.

6. Fernsteuerungssystem (10) nach Anspruch 4, **dadurch gekennzeichnet, daß** der Spannungsregler (39) so ausgeführt ist, daß er den Arbeitszyklus der Spannung verändert, die den Stromversorgungsschienen (44) zugeführt wird.

7. Fernsteuerungssystem (10) nach Anspruch 4, **dadurch gekennzeichnet, daß** der Spannungsregler (39) so ausgeführt ist, daß er die Frequenz der Spannung verändert, die den Stromversorgungsschienen (44) zugeführt wird.

8. Fernsteuerungssystem (10) nach Anspruch 1, **dadurch gekennzeichnet, daß** der Empfänger (30) so ausgeführt ist, daß er stufenweise die Kennlinie der Spannung über einen vorgegebenen Bereich reguliert, die den Stromversorgungsschienen (44) zugeführt wird.

9. Fernsteuerungssystem (10) nach Anspruch 8, **dadurch gekennzeichnet, daß** jeder Sender (20) einen Stellwiderstand (23) enthält, um das Steuersignal für das Steuern des Empfängers (30) zu ermitteln, um die Kennlinie der Spannung stufenweise zu regulieren, die den Stromversorgungsschienen (44) zugeführt wird.

10. Fernsteuerungssystem (10) nach Anspruch 1, **dadurch gekennzeichnet, daß** der Empfänger (30) so ausgeführt ist, daß er die Kennlinie der Spannung zwischen vorgegebenen Werten auswählt, die den Stromversorgungsschienen (44) zugeführt wird.

11. Fernsteuerungssystem (10) nach Anspruch 10, **dadurch gekennzeichnet, daß** jeder Sender (20) einen Wählschalter (23) enthält, um das Steuersignal für das Steuern des Empfängers (30) zu ermitteln, um die Kennlinie der Spannung auszuwählen, die den Stromversorgungsschienen (44) zugeführt wird.

12. Fernsteuerungssystem (10) nach Anspruch 1, **dadurch gekennzeichnet, daß** der Empfänger (30) so ausgeführt ist, daß er elektrisch zwischen den Stromversorgungsschienen (44) und einer Stromversorgungsquelle (50) für eine Rennbahn (40) geschaltet wird.

13. Konventionelle elektrische Spielzeugautorennbahn (40) in Verbindung mit dem Fernsteuerungssystem (10) nach Anspruch 1.

Revendications

1. Système de télécommande complémentaire (10) conçu pour être utilisé de façon optionnelle avec un circuit classique pour voitures-jouets électriques (40) formé par une série de sections de circuit (41 et 42) comprenant une section de circuit d'arrivée d'énergie (42), reliées ensemble pour créer des couloirs (40A et 40B) comportant des paires de même longueur de rails d'alimentation en énergie (44) destinés à alimenter en énergie les voitures-jouets électriques circulant le long des couloirs respectifs (40A et 40B), ladite section de circuit d'arrivée d'énergie (42) comprenant des bornes (45T) reliées aux rails d'alimentation en énergie (44) de chaque couloir (40A/40B) pour réaliser une connexion élec-

trique avec les bornes (52T) d'une source d'énergie (50) pouvant être commandée au moyen d'un contrôleur à fil, lequel système (10) comprend un émetteur (20) devant être utilisé par un joueur respectif relatif à chaque couloir (40A/40B) et un récepteur (30) destiné à réaliser une connexion électrique avec les rails d'alimentation en énergie (44), ledit émetteur (20) comprenant un générateur de signaux (26) destiné à générer un signal de commande devant être émis sans fil, ledit récepteur (30) comprenant une unité de traitement de signaux (38) destinée à traiter le signal de commande reçu de l'émetteur (20) afin de déterminer la caractéristique de la tension délivrée à la paire respective de rails d'alimentation en énergie (44) pour commander le déplacement de la voiture-jouet associée, dans lequel le récepteur (30) est conçu pour être utilisé entre ladite section de circuit d'arrivée d'énergie (42) et ladite source d'énergie (50), et le récepteur (30) comporte des bornes de sortie (32T) destinées à réaliser une connexion électrique avec les bornes (45T) de ladite section de circuit d'arrivée d'énergie (42) et des bornes d'entrée (33T) destinées à réaliser une connexion électrique avec les bornes (52T) de ladite source d'énergie (50).

2. Système de télécommande (10) selon la revendication 1, **caractérisé en ce que** le signal de commande est émis d'un émetteur respectif (20) et est reçu par le récepteur (30) sous la forme d'un signal radiofréquence.

3. Système de télécommande (10) selon la revendication 2, **caractérisé en ce que** le signal radiofréquence est à modulation d'amplitude.

4. Système de télécommande (10) selon la revendication 1, **caractérisé en ce que** le récepteur (30) incorpore un régulateur de tension (39) pour déterminer la caractéristique de la tension délivrée aux rails d'alimentation en énergie (44).

5. Système de télécommande (10) selon la revendication 4, **caractérisé en ce que** le régulateur de tension (39) est conçu pour changer le niveau de la tension délivrée aux rails d'alimentation en énergie (44).

6. Système de télécommande (10) selon la revendication 4, **caractérisé en ce que** le régulateur de tension (39) est conçu pour changer le rapport cyclique de la tension délivrée aux rails d'alimentation en énergie (44).

7. Système de télécommande (10) selon la revendication 4, **caractérisé en ce que** le régulateur de tension (39) est conçu pour changer la fréquence de la tension délivrée aux rails d'alimentation en énergie (44).

8. Système de télécommande (10) selon la revendication 1, **caractérisé en ce que** le récepteur (30) est conçu pour régler graduellement la caractéristique de la tension délivrée aux rails d'alimentation en énergie (44) sur une plage prédéterminée.

9. Système de télécommande (10) selon la revendication 8, **caractérisé en ce que** chaque émetteur (20) incorpore une résistance variable (23) pour déterminer le signal de commande destiné à commander le récepteur (30) afin de régler graduellement la caractéristique de la tension délivrée aux rails d'alimentation en énergie (44).

10. Système de télécommande (10) selon la revendication 1, **caractérisé en ce que** le récepteur (30) est conçu pour sélectionner la caractéristique de la tension délivrée aux rails d'alimentation en énergie (44) entre des valeurs prédéterminées.

11. Système de télécommande (10) selon la revendication 10, **caractérisé en ce que** chaque émetteur (20) incorpore un commutateur-sélecteur (23) pour déterminer le signal de commande destiné à commander le récepteur (30) afin de sélectionner la caractéristique de la tension délivrée aux rails d'alimentation en énergie (44).

12. Système de télécommande (10) selon la revendication 1, **caractérisé en ce que** le récepteur (30) est conçu pour être électriquement relié entre les rails d'alimentation en énergie (44) et une source d'alimentation en énergie (50) dudit circuit (40).

13. Circuit classique pour voitures-jouets électriques (40) en combinaison au système de télécommande (10) selon la revendication 1.

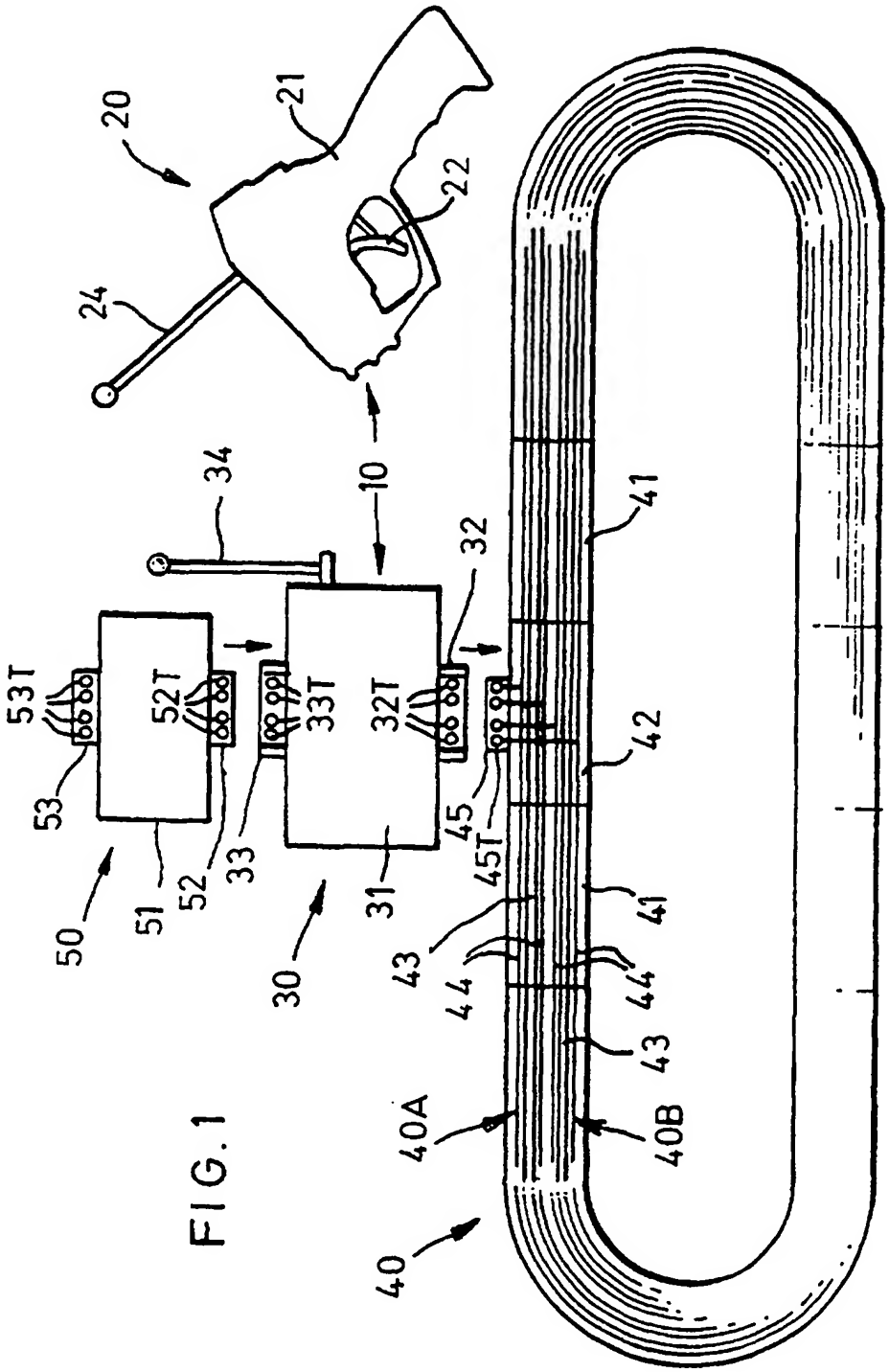

20
21
22
24
10
34
32
41
53T
52T
33T
32T
42
53
45
45T
51
52
33
31
50
30
43
44
41
44
43
40A
40B
40

FIG. 1

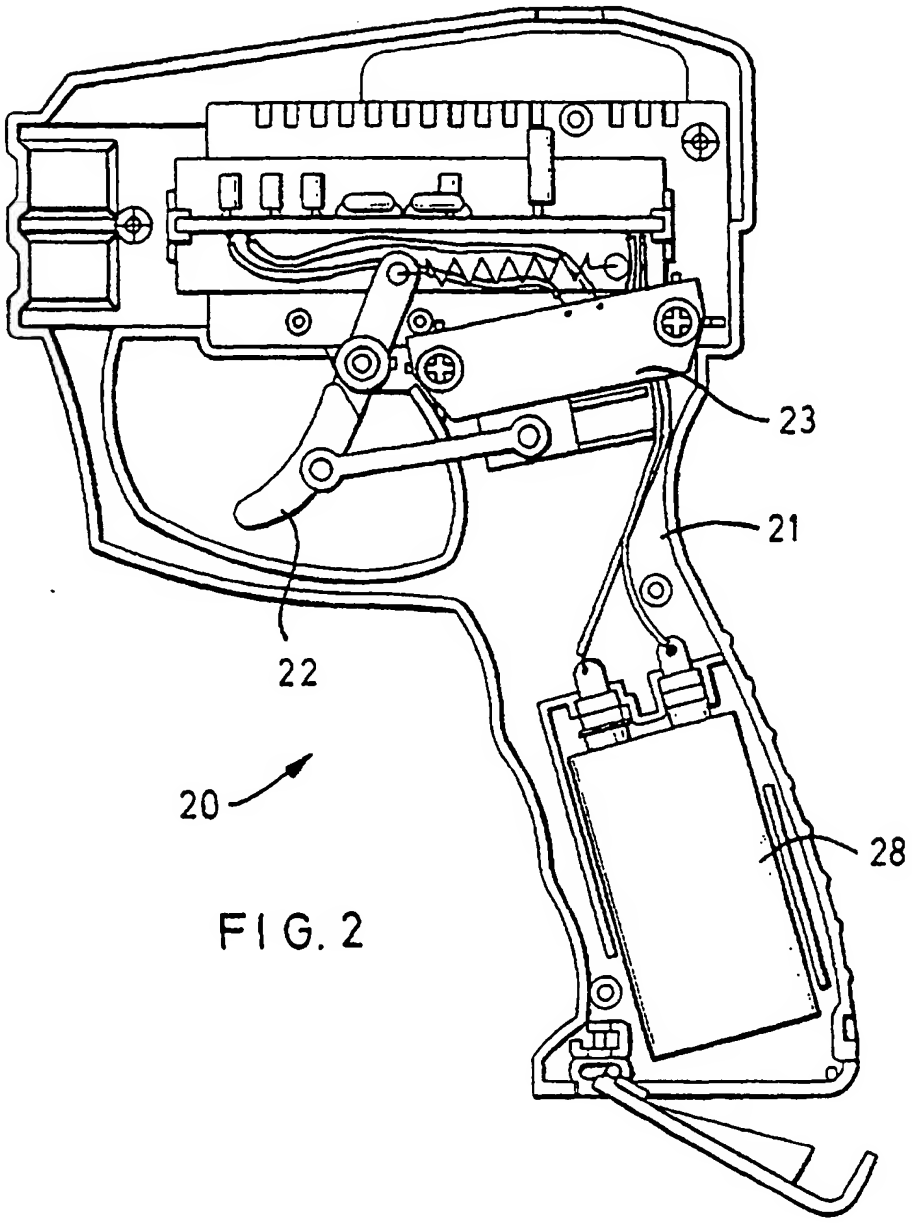


FIG. 2

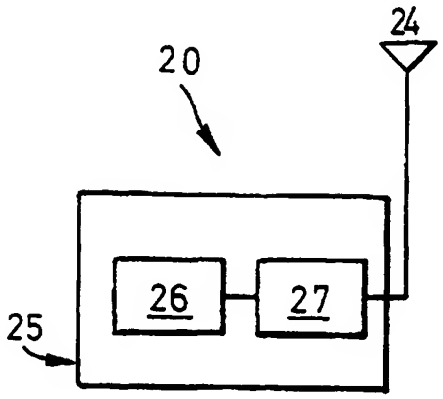


FIG. 3A

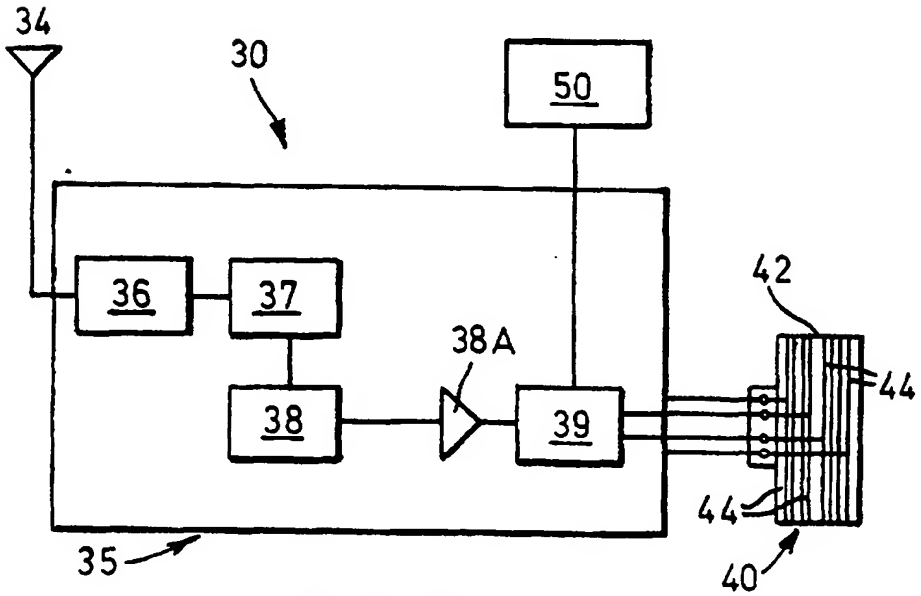


FIG. 3B

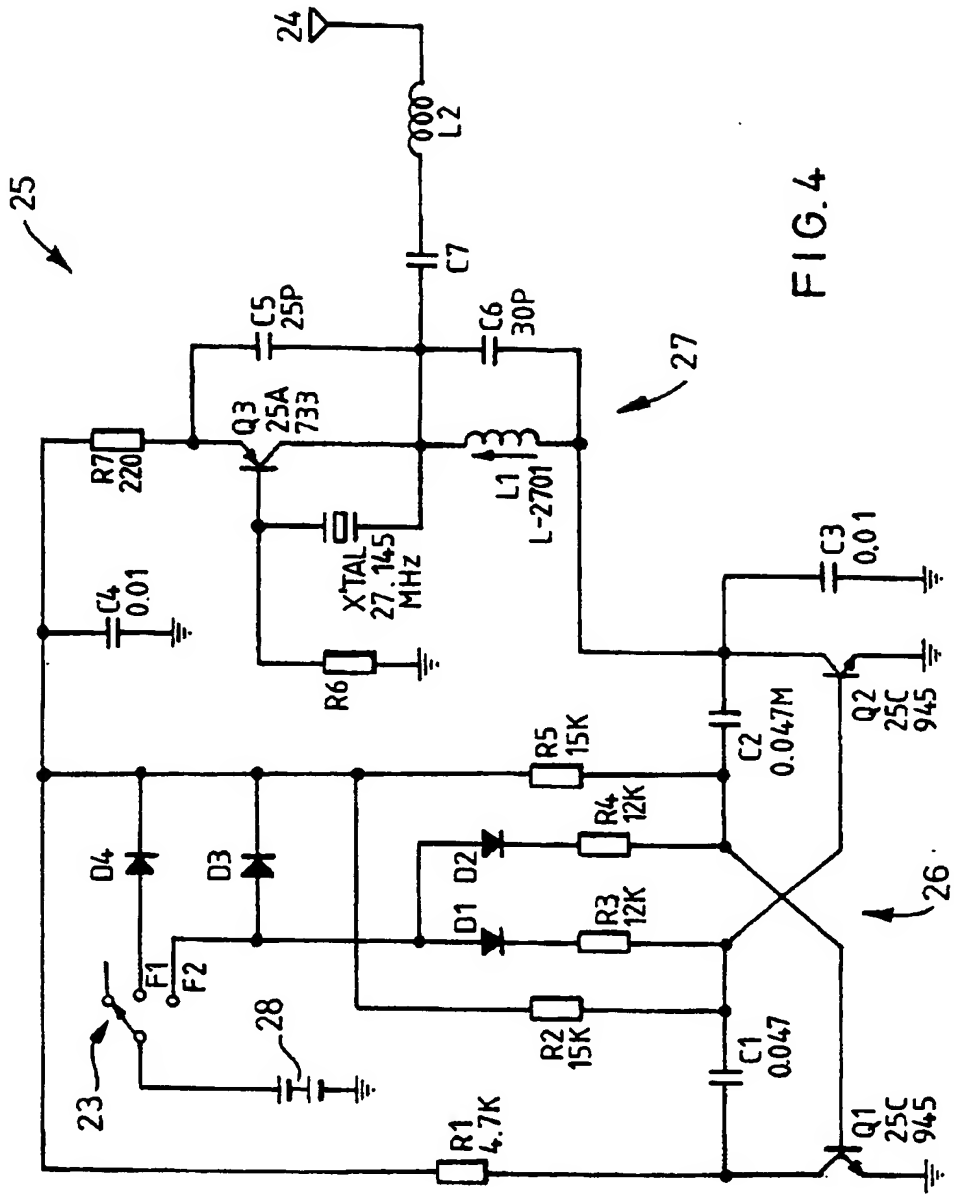

24
L2
C7
25
C5 25P
C6 30P
27
Q3 25A 733
R7 220
L1 L-2701
XTAL 27.145 MHz
C4 0.01
R6
C3 0.01
Q2 25C 945
C2 0.047M
R5 15K
R4 12K
D4
D3
D2
D1
R3 12K
26
F1
F2
28
23
R2 15K
C1 0.047
R1 4.7K
Q1 25C 945

FIG. 4

EP 0 806 230 B1

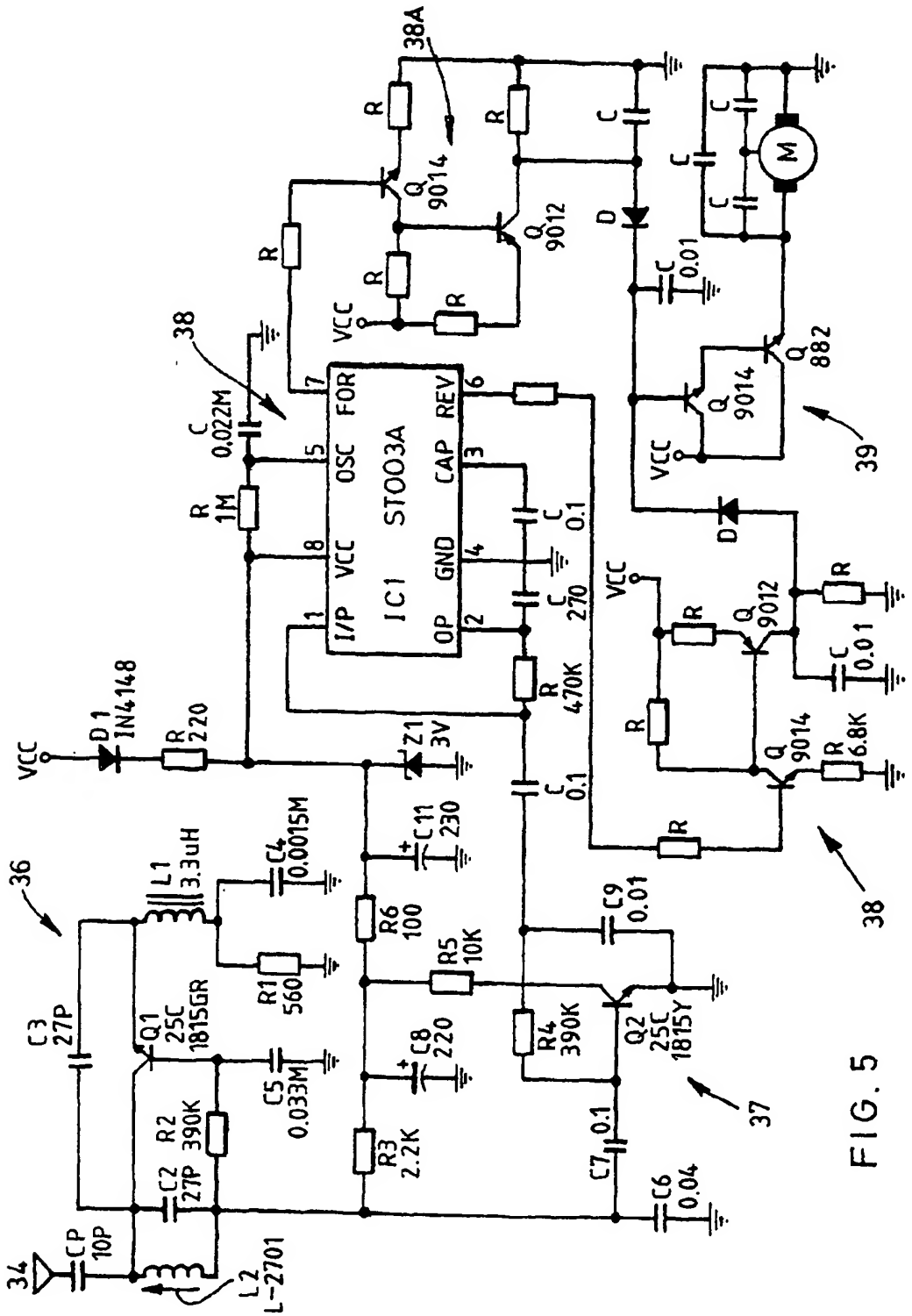


FIG. 5

FIG.6A

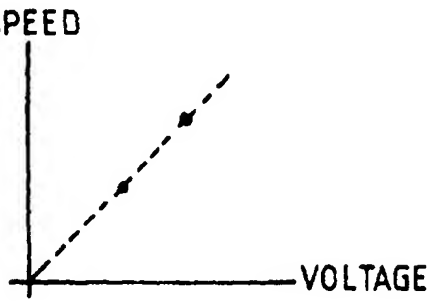


FIG.6B

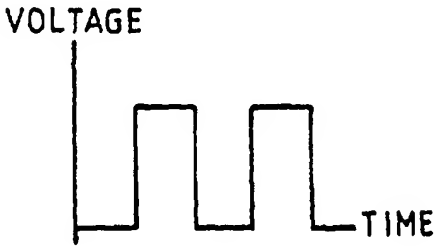


FIG.6C

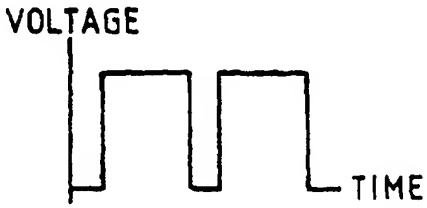


FIG.6D

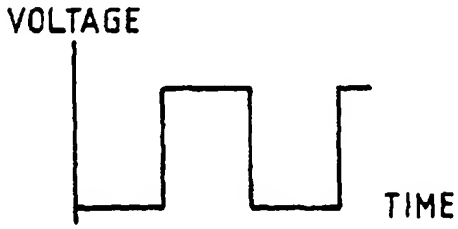
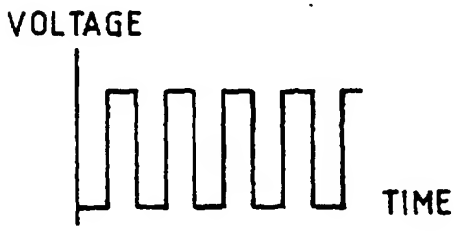


FIG.6E



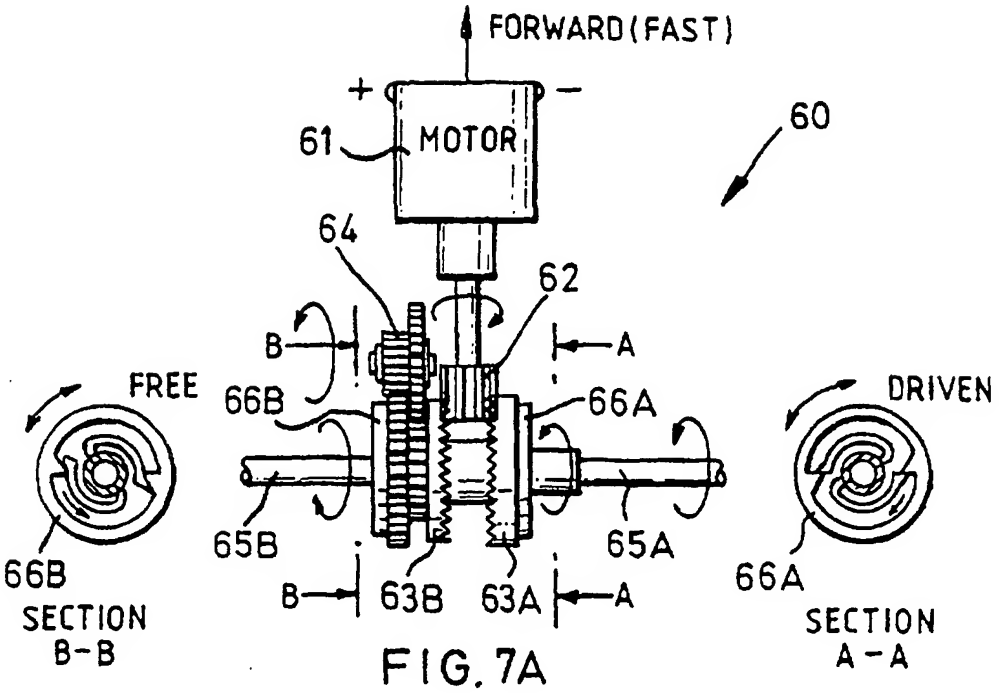

FORWARD(FAST)
+
MOTOR
−
61
60
64
62
B
A
FREE
66B
66A
DRIVEN
65B
65A
66B
SECTION
B-B
B
63B
63A
A
66A
SECTION
A-A

FIG. 7A

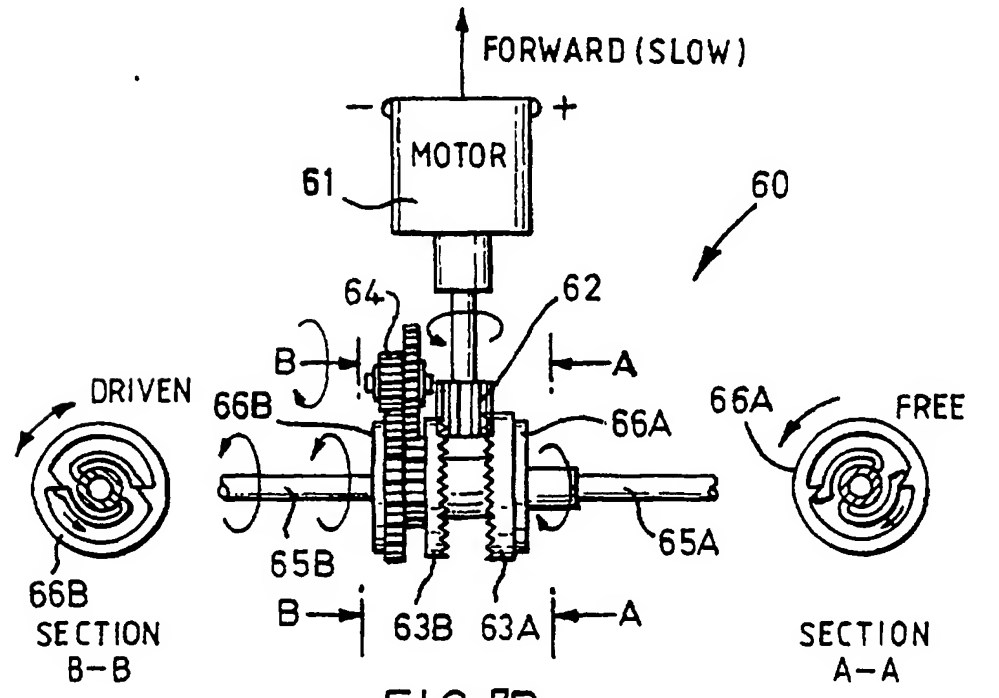

FORWARD(SLOW)
−
MOTOR
+
61
60
64
62
B
A
DRIVEN
66B
66A
66A
FREE
65B
65A
66B
SECTION
B-B
B
63B
63A
A
SECTION
A-A

FIG. 7B